AMENDMENT

In the Claims:

Please amend claims 2-4, 6-14 and 19-33 as follows below:

1. (Previously Presented) An apparatus for processing a differential first pulse amplitude modulated (PAM) signal having a time varying magnitude representing a sequence of integer-valued first data elements, the apparatus comprising:

amplifying means for amplifying the first PAM signal with an adjustable first gain to produce a second PAM signal;

digitizing means for processing the second PAM signal to generate a sequence of second data elements having values representing magnitudes of the second PAM signal at a succession of times; and

first automatic gain control (AGC) means for determining a number of second data elements generated per unit of time having values within a first range and for adjusting the first gain when the determined number falls outside a second range.

2. (Currently Amended) The apparatus in accordance with claim 1, wherein the first AGC means comprises:

first means for generating a ~~seventh~~ counter data of value representing a count of second data elements within a succession of N data elements having values falling within the first range, where N is an integer greater than 1, and

second means for adjusting the first gain when the value of the ~~seventh~~ counter data falls outside the second range.

3. (Currently Amended) The apparatus in accordance with claim 2, wherein the first means comprises:

means for generating ~~a sixth~~ an output data in response to each second data element, the ~~sixth~~ output data being of value indicating whether an absolute value of the second data element resides within the first range;

a first counter receiving the ~~sixth~~ output data, for altering the value of the ~~seventh~~ counter data in response to each pulse of a periodic clock signal (CLK) depending on whether the ~~sixth~~ output data is of value indicating that the absolute value of the second data element resides within the first range, and for setting the value of the ~~seventh~~ counter data to zero upon receipt of each pulse of a first control signal; and

means for supplying a pulse of the first control signal to the first counter in response to every Nth pulse of the clock signal.

4. (Currently Amended) The apparatus in accordance with claim 2, wherein the second means comprises:

a slicer for generating ~~eighth~~ slicer data in response to the ~~seventh~~ counter data of value indicating whether the value of the ~~seventh~~ counter data resides above, below or within the second range; and

means for altering the first gain in response to the value of the ~~eighth~~ slicer data.

5. (Previously Presented) The apparatus in accordance with claim 1, further comprising:

digital signal processing (DSP) means for processing the second data elements to produce a sequence of third data elements, each having a real number value that is substantially proportional to a product of the integer value of a corresponding one of the first data elements and a second gain;

slicer means for processing the third data elements to produce a sequence of fourth data elements, wherein each fourth data element has an integer value approximating a value of a corresponding one of the third data elements; and

second AGC means for controlling the second gain in response to a comparison of values of corresponding third and fourth data elements.

6. (Currently Amended) The apparatus in accordance with claim 5, wherein the second AGC means comprises:

means for generating ~~tenth~~ first sign indicating data in response to each fourth data element, wherein a value of the ~~tenth~~ first sign indicating data indicates whether a value of the fourth data element is zero, higher than zero, or lower than zero;

means for generating ~~eleventh~~ second sign indicating data in response to each third data element and its corresponding fourth data element, wherein a value of the ~~eleventh~~ second sign indicating data indicates whether a difference in values between the third data elements and its corresponding fourth data element is zero, higher than zero, or lower than zero;

counter means for adjusting a value of ~~thirteenth~~ count data in response with a combination of values of the ~~tenth~~ first sign indicating data and the ~~eleventh~~ second sign indicating data; and

second gain control means for adjusting the second gain in response to the ~~thirteenth~~ count data.

7. (Currently Amended) The apparatus in accordance with claim 6 wherein the second gain control means alters the second gain when the value of the ~~thirteenth~~ count data goes outside predetermined limits.

8. (Currently Amended) The apparatus in accordance with claim 7 wherein the second gain control means also signals the counter means to set the value of the ~~thirteenth~~ count data to zero when the value of the ~~thirteenth~~ count data goes outside the predetermined limits.

9. (Currently Amended) An apparatus for processing a differential first pulse amplitude modulated (PAM) signal having a time varying magnitude representing a sequence of integer-valued first data elements, the apparatus comprising:

amplifying means for amplifying the first PAM signal with an adjustable first gain to produce a second PAM signal;

digitizing means for processing the second PAM signal to generate a sequence of second data elements having values representing magnitudes of the second PAM signal at a succession of times;

first means for generating ~~seventh~~ counter data of value representing a number of second data elements within a succession of N data elements having values greater than a target value, where N is an integer greater than 1, and

second means for adjusting the first gain that increases the first gain when the value of the ~~seventh~~ counter data is less than a low threshold value and decreases the first gain when the value of the ~~seventh~~ counter data is greater than a high threshold value, the low threshold value and the high threshold value defining a second range;

digital signal processing (DSP) means for processing the second data elements to produce a sequence of third data elements, each having a real number value that is substantially proportional to a product of the integer value of a corresponding one of the first data elements and a second gain;

slicer means for processing the third data elements to produce a sequence of fourth data elements, wherein each fourth data element has an integer value approximating a value of a corresponding one of the third data elements; and

~~second~~ AGC means for controlling the second gain in response to a comparison of values of corresponding third and fourth data elements.

10. (Currently Amended) An apparatus for processing a differential first pulse amplitude modulated (PAM) signal having a time varying magnitude representing a sequence of integer-valued first data elements, the apparatus comprising:

amplifying means for amplifying the first PAM signal with an adjustable first gain to produce a second PAM signal;

digitizing means for processing the second PAM signal to generate a sequence of second data elements having values representing magnitudes of the second PAM signal at a succession of times;

first means for generating ~~seventh~~ counter data of value representing a number of second data elements within a succession of N data elements having values falling within a first range, where N is an integer greater than 1, and

second means for adjusting the first gain when the value of the ~~seventh~~ counter data falls outside a second range;

digital signal processing (DSP) means for processing the second data elements to produce a sequence of third data elements, each having a real number value that is substantially proportional to a product of the integer value of a corresponding one of the first data elements and a second gain;

slicer means for processing the third data elements to produce a sequence of fourth data elements, wherein each fourth data element has an integer value approximating a value of a corresponding one of the third data elements;

~~second~~ AGC means for controlling the second gain in response to a comparison of values of corresponding third and fourth data elements;

wherein the ~~second~~ AGC means comprises:

means for generating ~~tenth~~ first sign indicating data in response to each fourth data element, wherein a value of the ~~tenth~~ first sign indicating data indicates whether a value of the fourth data element is zero, higher than zero, or lower than zero;

means for generating ~~eleventh~~ second sign indicating data in response to each third data element and its corresponding fourth data element, wherein a value of the ~~eleventh~~ second sign indicating data indicates whether a difference in values between the third data element and its corresponding fourth data element is zero, higher than zero, or lower than zero;

means for adjusting a value of ~~thirteenth~~ count data in response to a combination of values of the ~~tenth~~ first sign indicating data and the ~~eleventh~~ second sign indicating data; and

~~second~~ gain control component means for adjusting the second gain in response to the ~~thirteenth~~ count data.

11. (Currently Amended) The apparatus in accordance with claim 10 wherein the ~~second~~ gain control component means alters the second gain when the value of the ~~thirteenth~~ count data goes outside predetermined limits.

12. (Currently Amended) The apparatus in accordance with claim 11 wherein the ~~second~~ gain control component means also signals the counter means to set the value of the ~~thirteenth~~ count data to zero when the value of the ~~thirteenth~~ count data goes outside the predetermined limits.

13. (Currently Amended) The apparatus in accordance with claim 9, wherein the first means comprises:

means for generating ~~sixth~~ output data in response to each second data element, the ~~sixth~~ output data being of value indicating whether an absolute value of the second data element resides within the first range;

a first counter receiving the ~~sixth~~ output data, for altering the value of the ~~seventh~~ counter data in response to each pulse of a periodic clock signal (CLK) depending on whether the ~~sixth~~ output data is of value indicating that the absolute value of the second data element resides within the first range, and for setting the value of the ~~seventh~~ counter data to zero upon receipt of each pulse of a first control signal; and

means for supplying a pulse of the first control signal to the first counter in response to every Nth pulse of the clock signal.

14. (Currently Amended) The apparatus in accordance with claim 13, wherein the second means comprises:

a slicer for generating ~~eighth~~ slicer data in response to the ~~seventh~~ counter data of value indicating whether the value of the ~~seventh~~ counter data resides above, below or within the second range; and

means for altering the first gain in response to the value of the ~~eighth~~ slicer data.

15. (Cancelled).

16. (Cancelled).

17. (Cancelled).

18. (Cancelled).

19. (Currently Amended) A method for processing a differential first pulse amplitude modulated (PAM) signal having a time varying magnitude representing a sequence of integer-valued first ~~date~~ data elements, the method comprising the steps of:

a. amplifying the first PAM signal with an adjustable first gain to produce a second PAM signal;

b. digitizing the second PAM signal to generate a sequence of second data elements having values representing magnitudes of the second PAM signal at a succession of times; and

c. processing the second data elements to determine a number of second data elements generated per unit time having values greater than a target value that defines a first range and increasing the first gain when the determined number of less than a low threshold value and decreasing the first gain when the determined number is greater than a high threshold value, the low threshold value and the high threshold value defining a second range.

20. (Currently Amended) The method in accordance with claim 19, wherein step c comprises the substeps of:

c1. generating a ~~seventh~~ counter data of value representing a count of a number of second data elements within a succession of N data elements having values falling within the first range, where N is an integer greater than 1, an

c2. adjusting the first gain when the value of the ~~seventh~~ counter data falls outside the second range.

21. (Currently Amended) The method in accordance with claim 20, wherein step c1 comprises the substeps of:

c11. generating a pulse of a first control signal in response to every Nth pulse of a periodic clock signal (CLK);

c12. generating ~~sixth~~ output data in response to each second data element, the ~~sixth~~ output data being of value indicating whether an absolute value of the second data element resides within the first range; and

c13. altering the value of the ~~seventh~~ counter data in response to each pulse of the periodic clock signal (CLK) depending on whether the ~~sixth~~ output data is of value indicating that the absolute value of the second data element resides within the first range, and

c14. setting the value of the ~~seventh~~ counter data to zero on each pulse of the first control signal.

22. (Currently Amended) The method in accordance with claim 20, wherein step c further comprising the substeps of:

c3. generating ~~eighth~~ slicer data in response to the ~~seventh~~ counter data of value indicating whether the value of the ~~seventh~~ counter data resides above, below or within the second range; and

c4. altering the first gain in response to the value of the ~~eighth~~ slicer data.

23. (Currently Amended) The method in accordance with claim 19, further comprising the steps of:

e. processing the second data elements with a second gain to produce a sequence of third data elements, each having a real number value that is substantially proportional to a product of the integer value of a corresponding one of the first data elements and a second gain;

f. processing the third data elements to produce a sequence of fourth data elements, wherein each fourth data element has an integer value approximating a value of a corresponding one of the third data elements; and

g. controlling the second gain in response to a comparison of values of corresponding elements of the third and fourth data elements.

24. (Currently Amended) A method for processing a differential first pulse amplitude modulated (PAM) signal having a time varying magnitude representing a sequence of integer-valued first ~~date~~ data elements, the method comprising:

a. amplifying the first PAM signal with an adjustable first gain to produce a second PAM signal;

b. digitizing the second PAM signal to generate a sequence of second data elements having values representing magnitudes of the second PAM signal at a succession of times;

c. processing the second data elements to determine a number of second data elements generated per unit time falling within a first range and adjusting the first gain when the determined number falls outside a second range;

e. processing the second data elements with a second gain to produce a sequence of third data elements, each having a real number value that is substantially proportional to a product of the integer value of a corresponding one of the first data elements and a second gain;

f. processing the third data elements to produce a sequence of fourth data elements, wherein each fourth data element has an integer value approximating a value of a corresponding one of the third data elements;

g. controlling the second gain in response to a comparison of values of corresponding elements of the third and fourth data elements;

wherein controlling the second gain comprises:

g1. generating ~~tenth~~ first sign indicating data in response to each fourth data element, wherein a value of the ~~tenth~~ first sign indicating data indicates whether a value of the fourth data element is zero, higher than zero, or lower than zero;

g2. generating ~~eleventh~~ second sign indicating data in response to each third data element and its corresponding fourth data element, wherein a value of the ~~eleventh~~ second sign indicating data indicates whether a difference in values between the third data element and its corresponding fourth data element is zero, higher than zero, or lower than zero;

g3. adjusting a value of ~~thirteenth~~ count data in response with a combination of values of the ~~tenth~~ first sign indicating data and the ~~eleventh~~ second sign indicating data; and

g4. adjusting the second gain in response to the ~~thirteenth~~ count data.

25. (Currently Amended) The method in accordance with claim 24 wherein the second gain is altered when the value of the ~~thirteenth~~ count data goes outside predetermined limits.

26. (Currently Amended) The method in accordance with claim 25 wherein step g further comprises the substep of:

g5. setting the value of the ~~thirteenth~~ count data to zero when the value ~~thirteenth~~ count data goes outside the predetermined limits.

27. (Currently Amended) A method for processing a differential first pulse amplitude modulated (PAM) signal having a time varying magnitude representing a sequence of integer-valued first data elements, the method comprising the steps of:

a. amplifying the first PAM signal with an adjustable first gain to produce a second PAM signal;

b. digitizing the second PAM signal to produce a sequence of second data elements representing magnitudes of the second PAM signal at a succession of times;

c. generating ~~seventh~~ counter data of value representing a count of a number of second data elements within a succession of N data elements having values greater than a target value that defines a first range, where N is an integer greater than 1;

d. adjusting the first gain by increasing the first gain when the value of the ~~seventh~~ counter data is less than a low threshold value and decreasing the first gain when the value of the ~~seventh~~ counter data is greater than a high threshold value, the low threshold value and the high threshold value defining a second range;

e. processing the second data elements to produce a sequence of third data elements, each having a real number value that is substantially proportional to a product of the integer value of a corresponding one of the first data elements and a second gain;

f. processing the third data elements to produce a sequence of fourth data elements, wherein each fourth data element has an integer value approximating a value of a corresponding one of the third data elements; and

g. controlling the second gain in response to a comparison of values of corresponding third and fourth data elements.

28. (Currently Amended) A method for processing a differential first pulse amplitude modulated (PAM) signal having a time varying magnitude representing a sequence of integer-valued first data elements, the method comprising:

a. amplifying the first PAM signal with an adjustable first gain to produce a second PAM signal;

b. digitizing the second PAM signal to produce a sequence of second data elements representing magnitudes of the second PAM signal at a succession of times;

c. generating ~~seventh~~ counter data of value representing a count of a number of second data elements within a succession of N data elements having values falling within the first range, where N is an integer greater than 1;

d. adjusting the first gain when the value of the ~~seventh~~ counter data falls outside the second range;

e. processing the second data elements to produce a sequence of third date elements, each having a real number value that is substantially proportional to a product of the integer value of a corresponding one of the first data elements and a second gain;

f. processing the third data elements to produce a sequence of fourth data elements, wherein each fourth data element has an integer value approximating a value of a corresponding one of the third data elements;

g. controlling the second gain in response to a comparison of values of corresponding third and fourth data elements;

wherein controlling the second gain comprises:

g1. generating ~~tenth~~ first sign indicating data in response to each fourth data element, wherein a value of the ~~tenth~~ first sign indicating data indicates whether a value of the fourth data element is zero, higher than zero, or lower than zero;

g2. generating ~~eleventh~~ second sign indicating data in response to each third data element and its corresponding fourth data element, wherein a value of the ~~eleventh~~ second sign indicating data indicates whether a difference in values between the third data element and its corresponding fourth data element is zero, higher than zero, or lower than zero;

g3. adjusting a value of ~~thirteenth~~ count data in response to a combination of values of the ~~tenth~~ first sign indicating data and the ~~eleventh~~ second sign indicating data; and

g4. adjusting the second gain in response to the ~~thirteenth~~ count data.

29. (Currently Amended) The method in accordance with claim 28 wherein the second gain is adjusted at step g4 when the value of the ~~thirteenth~~ count data goes outside predetermined limits.

30. (Currently Amended) The method in accordance with claim 29 wherein step g further comprises the substep of:

g5. setting the value of the ~~thirteenth~~ count data to zero when the value of the ~~thirteenth~~ count data goes outside the predetermined limits.

31. (Currently Amended) The method in accordance with claim 27, further comprising the steps of:

h. generating ~~seventh~~ counter data of value representing a count of a number of second data elements within a succession of N data elements having values falling within the first range, where N is an integer greater than 1; and

i. adjusting the first gain when the value of the ~~seventh~~ counter data falls out side the second range.

32. (Currently Amended) The method in accordance with claim 31, wherein step h compress the substeps of:

h1. generating ~~sixth~~ output data in response to each second data element, the ~~sixth~~ output data being of value indicating whether an absolute value of the second data element resides within the first range;

h2. altering the value of the ~~seventh~~ counter data in response to each pulse of a periodic clock signal (CLK) depending on whether the ~~sixth~~ output data is of value indicating that the absolute value of the second data element resides within the first range, and

h3. setting the value of the ~~seventh~~ counter data to zero in response to every Nth pulse of the clock signal.

33. (Currently Amended) The method in accordance with claim 32, wherein step h3 comprises the substeps of:

h31. generating ~~eighth~~ slicer data in response to the ~~seventh~~ counter data of value indicating whether the value of the ~~seventh~~ counter data resides above, below or within the second range; and

h32. altering the first gain in response to the value of the ~~eighth~~ slicer data.

34. (Cancelled).

35. (Cancelled).

36. (Cancelled).

37. (Cancelled).